

CLAIMS

1. A film comprising:

- 5 (a) a phosphoprotein preparation, wherein the phosphoprotein preparation has been obtained by partially cross linking a partial hydrolysate of casein or a caseinate,
- (b) a source of one or more physiologically acceptable cations, and
- (c) a plasticizer.

10 2. A film according to claim 1, wherein the film is edible.

3. A film according to claim 1 or 2, wherein the film is substantially soluble.

4. A film according to any one of the preceding claims, wherein the cations are divalent.

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5. A film according to any one of the preceding claims, wherein the source of the cations comprises a substantially water-insoluble salt of the cations.

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6. A film according to any one of the preceding claims, wherein the cations comprise calcium ions.

7. A film according to claim 6, wherein the source of calcium ions comprises calcium phosphate.

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8. A film according to claim 7, wherein some of all of the calcium phosphate is in the form of calcium hydroxyapatite.

9. A film according to any one of the preceding claims, wherein the source of calcium comprises natural milk calcium phosphate.

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10. A film according to claim 9, wherein the natural milk calcium phosphate and the phosphoprotein preparation are present in the film in a weight ratio of about 0.3:1 to about 1.3:1.

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11. A film according to any one of the preceding claims, wherein the plasticizer comprises one or more polyhydric alcohols.
- 5 12. A film according to claim 11, wherein the polyhydric alcohol comprises glycerol.
13. A film according to any one of the preceding claims, wherein the degree of hydrolysis of the casein or caseinate prior to the partial cross linking is in the range of about 0.5% to about 10% of the total number of peptide bonds.
- 10 14. A film according to any one of the preceding claims, wherein the degree of hydrolysis of the casein or caseinate prior to the partial cross linking is in the range of about 2% to about 8% of the total number of peptide bonds.
- 15 15. A film according to any one of the preceding claims, wherein the partial hydrolysate of casein or a caseinate has been obtained by enzymatic hydrolysis of acid casein, rennet casein or a caseinate.
- 20 16. A film according to claim 15, wherein the enzyme is trypsin, and the partial hydrolysis has been carried out at a pH of from about 7 to about 8.
17. A film according to any one of the preceding claims, wherein the partial cross linking has been carried out enzymatically, using transglutaminase.
- 25 18. A film according to any one of the preceding claims, wherein the degree of partial cross linking is such that the resulting phosphoprotein preparation comprises about 10 μmol or more cross links per gram of protein.
- 30 19. A film according to any one of the preceding claims, wherein the degree of partial cross linking is such that the resulting phosphoprotein preparation comprises between about 10 μmol and 250 μmol cross links per gram of protein.

20. A film according to any one of the preceding claims, wherein the degree of partial cross linking is such that the resulting phosphoprotein preparation comprises between about 50 μmol and 160 μmol cross links per gram of protein.

5 21. A film according to any one of the preceding claims, wherein the film further comprises one or more emulsifiers.

10 22. A film according to claim 21, wherein the emulsifier comprises a citric acid ester of mono- and diglycerides.

23. A film according to any one of the preceding claims, wherein the film further comprises one or more additional agents selected from the group consisting of flavoring or breath freshening agents, sweeteners, coloring agents, pH control agents and stabilizers.

15 24. A film according to any one of the preceding claims, wherein the film further includes one or more active agents selected from the group consisting of an oral care agent, a pharmaceutical or veterinary agent, a nutraceutical agent, a salivary stimulant agent, a vitamin, a mineral and combinations thereof.

20 25. A food product including an edible coating comprising a film as claimed in any one of the preceding claims.

26. A process of producing an edible film, the process comprising the steps of:

25 (a) processing a mixture comprising (a) a phosphoprotein preparation, wherein the phosphoprotein preparation has been obtained by partially cross linking a partial hydrolysate of casein or a caseinate, (b) a source of one or more physiologically acceptable cations, and (c) a plasticizer, to form a film; and

 (b) optionally, drying the film to reduce the moisture content to a desired level.

30 27. A process according to claim 26, wherein the mixture includes water.

28. A process according to claim 26 or 27, wherein the processing includes the steps of applying the mixture to a surface followed by drying to form the film.
29. A process according to claim 26 or 27, wherein the processing comprises extruding the mixture to form a film.
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30. A mixture capable of being processed to produce an edible film, the mixture comprising:
 - (a) a phosphoprotein preparation, wherein the phosphoprotein preparation has been obtained by partially cross linking a partial hydrolysate of casein or a caseinate,
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 - (b) a source of one or more physiologically acceptable cations, and
 - (c) a plasticizer.
31. A mixture as claimed in claim 30, wherein the mixture is thermoplastic and extrudable.
- 15 32. A mixture as claimed in claim 31, which is in the form of a powder.